PAPIO-MISSOURI RIVER
NATURAL
RESOURCES
DISTRICT

8901 S. 154TH ST.
OMAHA, NE 68138-3621
(402) 444-6222
FAX (402) 895-6543
www.papionrd.org

Memorandum

To: File

From: Marlin J. Petermann, Asst. General Manager, P-MRNRD

Subject: Flood Emergency Activities on the Platte and Elkhorn Rivers January 2015

Date: February 12, 2015

Weekly River Ice Observations:

Cold temperatures in late December 2014 and early January 2015 set the stage for possible ice jam induced flooding along the lower Platte and Elkhorn Rivers in Eastern Nebraska as snow melting and ice break-up occurred.

Preparations in readiness for such a possible event had begun months before with a River Ice Observers Workshop sponsored by the Nebraska Emergency Management Agency (NEMA) on December 16, 2014. The observers began filing weekly reports, along with summary statements prepared by NEMA, with the Nebraska Department of Natural Resources (NDNR) who places them on their web site for dissemination.

Ice Thickness Measurements:

Weekly Platte River ice thickness measurements were not taken by P-MRNRD personnel, as in past years, due to safety concerns of getting on the ice. Open water areas which had never iced over and melting from warm weather in mid-January did not allow access onto the ice for measurements in the two normal locations near Valley and Ashland. From minor ice breakup in some locations, it was estimated that thicknesses ranged from 10 to 12 inches.

NWS Webinars and Emergency Management Meetings:

No ice and weather reporting webinars by the National Weather Service (NWS) or Emergency Management Agency meetings were held because there was very little snow cover in the basin and it was generally believed that ice thicknesses were not great and that the river ice would melt, break-up and move out of the system without major incident.

ICE DUSTING:

Readiness activities also included preparations by NEMA for "dusting" of the Lower Platte River ice as a preventative measure to help melt and weaken the ice cover prior to breakup. As dusting has normally been done after mid-February, no Omaha District Corps of Engineers (USACE) technical recommendations or NEMA decision had yet been made on whether or not to carry out an ice dusting operation on the Lower Platte this year.

Daily Monitoring:
District personnel monitored river ice conditions from the ground daily from January 26th until ice out; and by air via an Omaha helicopter on January 27th and a fixed wing Civil Air Patrol plane on January 28th and 29th. P-MRNRD observers went on 24-hour river watch from Tuesday January 27th to Thursday, January 29st. Following is a listing of major breakup events on the Lower Platte and Elkhorn Rivers as ice moved out of the system. Graphs showing these events at river gauge locations are attached. Maps showing the Platte River ice jam location in the area just south of Hwy 92 are also attached.

Ice Breakup:

January 26, 2015 - Monday
Ice on the Platte River downstream of the mouth of the Elkhorn River had moved out without incident over the previous few days leaving a reasonable wide open channel all the way downstream to the Missouri River. The Platte River channel between Hwy 6 and I-80 had opened up under the Lincoln Water System Bridge, however, the west channel remained jammed up with intact and broken up ice. Mostly intact ice cover remained on both the Platte and Elkhorn Rivers upstream of their confluence.

Late in the afternoon on Monday, some ice movement and break up was reported on the Platte River in the Cedar Lakes area near Cedar Bluffs upstream of Fremont. No further reports were received, but U.S. Geological Service (USGS) gaging stations indicate that a surge of ice and water moved down the Platte River from North Bend to Ashland that afternoon and night. It appears that the breakup moved through Hwy 79 at North Bend around 4:00 pm, Hwy 64 at LeShara about 9:00 pm, the Venice gage (2.5 miles south of Hwy 92) about midnight and Hwy 6 at Ashland around 6:00 am the next morning (January 27th). This run of ice and water opened up a reasonably wide channel in the Platte from Hwy 77 at Fremont (most upstream aerial surveillance) to the mouth of the Elkhorn River, **except** for an area just downstream of Hwy 92.

January 27, 2015 – Tuesday
Very early Tuesday morning flooding and rescue operations were reported in the Two Rivers State Park (Douglas County) and Woods Landing development (Saunders County) areas along the Platte River south of Hwy 92. Papio-Missouri River NRD personnel dispatched to the area and with the aide of the Omaha Police helicopter spotlight identified an ice jam in the Platte River extending approximately 1.5 miles from just south of the extension of Q Street at the lower end to just north of an extension of F Street at the upstream end. Aerial surveillance in the daylight that morning generally confirmed those locations of the ice jam, although it had accumulated additional ice that had floated into the upstream end extending it to nearly 2 miles in the Platte River. The upstream end was about ¼ mile north of the abandoned railroad bridge pilings located along the west side of the river and the downstream end was right at the USGS river gaging station. The lower half of the ice jam was located along and immediately adjacent to the upstream Clear Creek Levee (part of the USACE Western Sarpy Clear Creek Levee Project (WSCC) in Saunders County and was causing flood stages within 12-18 inches of the top of the levee tie-back to County Road 4 (between Saunders County Roads K and L). Extensive seepage through the levee at some locations was identified that morning and the USACE contractor doing the levee project rehabilitation work was shuffled into "Flood fight" mode to

mitigate the seepage problems being experienced. Some ice chunks that had been pushed up against the levee were measured at approximately 2 feet thick.

Upon consultation with the USACE, Emergency Management Agencies, partner NRD's and other agencies, the P-MRNRD General Manager declared a flood emergency and the ice jam explosives contractor (Dykon Explosives from Tulsa, Oklahoma) was notified to mobilize for operations at the ice jam location. Two of the major considerations that went into the declaration:

1. The condition of the Clear Creek levee and
2. The forecast of major cold temperatures and snow later in the week.

A stand-by notice had not been previously issued to the explosives contractor, so the earliest anticipated arrival was Thursday, January 29th.

An agency coordination teleconference (organized by Douglas County EMA) was held that afternoon. County EMA's, NRD's, NEMA, USACE, NWS and others participate in the call. Explanation of current conditions and coordination of the potential ice flooding operations were the main topics discussed.

January 28, 2015 – Wednesday

The ice jam and flooding conditions in the area were basically static throughout the day. Another agency and call-in meeting was held at the Valley NWS office this afternoon. Continued planning and coordination for the explosives operation and initial discussions and set-up of an Incident Command (IC) Structure were held. An IC meeting was scheduled for 7:30am at the Two Rivers Superintendent Shop the next morning with blasting operations anticipated to begin around 8:00 am, depending upon wind conditions. The contractor explosives assembly and helicopter landing staging area was established at one of the asphalt parking lots at Two Rivers SRA.

January 29, 2015 – Thursday

Very early in the morning (just after midnight) NRD personnel monitoring the Platte River reported that ice cleared out of the east channel at Hwy 92 and a channel had opened up along the west bank of the Platte River ice jam to near the Clear Creek Levee Tieback. Thus resulting in a jam now only about 0.7 miles in length. Flooding levels also dropped about one foot at the upstream end of the jam.

The Incident Command meeting was held at Two Rivers SRA at 7:30 pm with Dykon Explosives present to explain their operation. A press conference was scheduled at the abandoned Hwy 92 Bridge for 10:00 am that morning. The helicopter for the operation coming out of Wichita, KS, had not yet arrived, but would likely not have been able to fly due to the 25-35 mph sustained winds (with gusts to 45 mph).

At approximately 9:45 am, as the contractor was being shown the ice jam on ground level from the vantage point of the Clear Creek levee, it was noticed that the ice was starting to move along the west bank of the river. Within minutes a channel, varying in width from 100-200 yards wide

open up from the upstream end (which now had been near the Clear Creek levee tieback) to the downstream end of the jam. Floodwater levels upstream began to fall as a large surge of ice and water moved downstream through the Lower Platte River that day without incident. The attached graphs show the 1 ft. to 2 ft. surge at the Venice and downstream gages.

The natural release of the ice jam by "Mother Nature" was reported at the 10:00 am press conference as well as an announcement that the blasting operations had therefore been called off.

February 8 and 9, 2015 – Sunday and Monday

Cold weather conditions and snow formed a thin re-icing of the Lower Platte River in early February. Also ice had not cleared out of tributary streams such as the Loup Rivers. As a result two relatively large ice and water surges occurred on the Lower Platte River again. NRD personnel closely monitored the ice jam area (since a somewhat narrow channel 100-200 yards wide still existed) and all moved through the system without major incident.

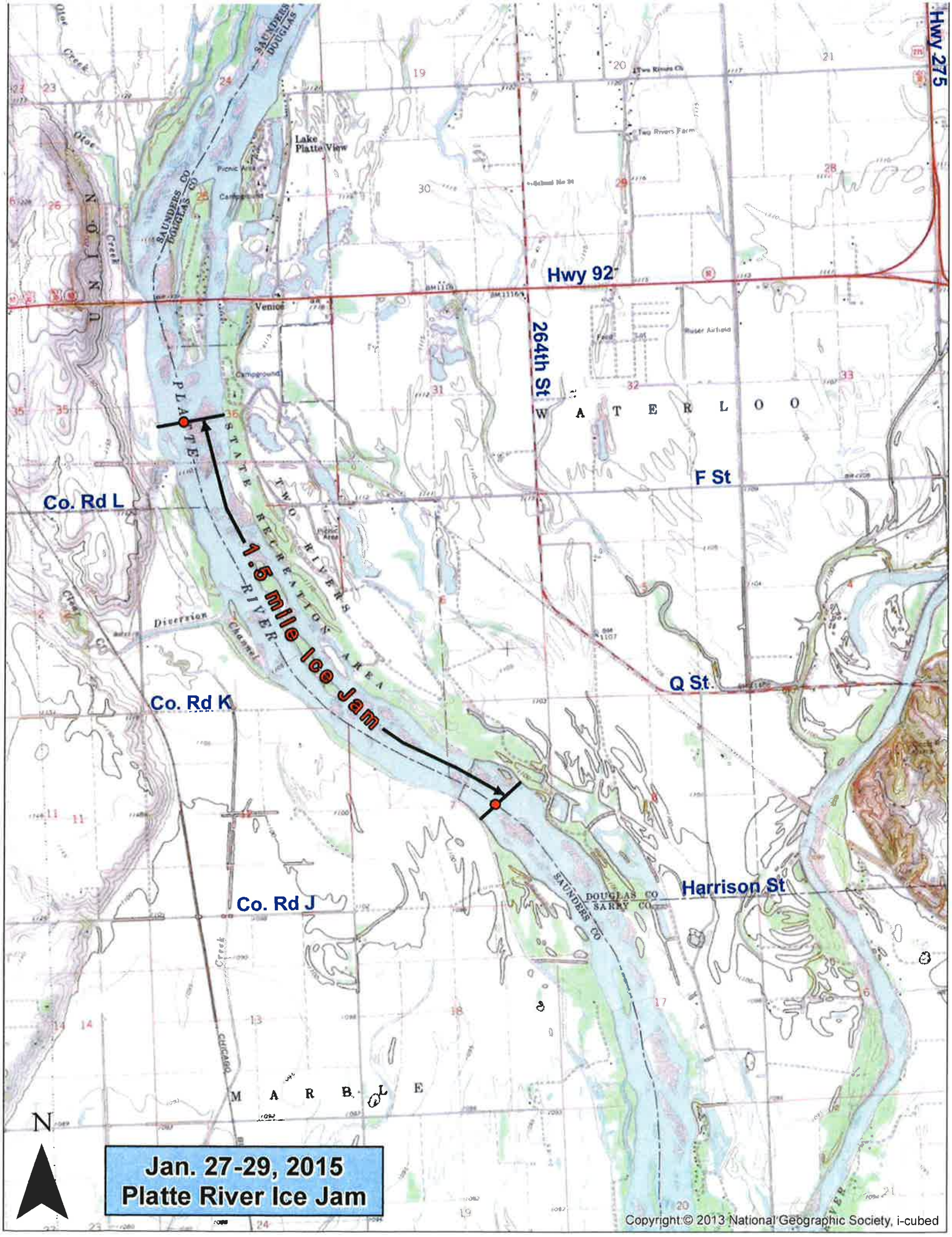
BLASTING:

The District was prepared to implement the explosives contract with Dykon called for in the Ice Jam Interlocal Agreement between the 4 counties and 3 NRDs along the Lower Platte below Fremont. The contractor had not been placed on "Stand-by" status, but was mobilized to the ice jam area near the Two Rivers SRA downstream of Hwy 92 and blasting was to begin on January 29th, if the jam had not released that very morning. Thankfully this last resort measure was not needed.

Follow-up:

A post event ("hot wash") meeting was held at the Waterloo Fire Station at 10:00 am on Monday, February 2nd to compare notes and further discuss and finalize an "Incident Command" Structure to assist in a smooth operation in the future, if needed. Representatives of Waterloo Fire, Douglas and Sarpy County EMA's, P-MRNRD and NWS were in attendance.

13015 MJP:pb file 534


Hwy 275
Hwy 92
264th St
F St
Q St
Co. Rd L
Co. Rd K
Co. Rd J
Harrison St
1.5 mile Ice Jam
Lake Platte View
Venice
Diversion Channel
PLATTE RIVER
TWO RIVERS STATE RECREATION AREA
W A T E R L O O
M A R B L E
SAUNDERS CO
DOUGLAS CO
SARPY CO
N
Jan. 27-29, 2015
Platte River Ice Jam
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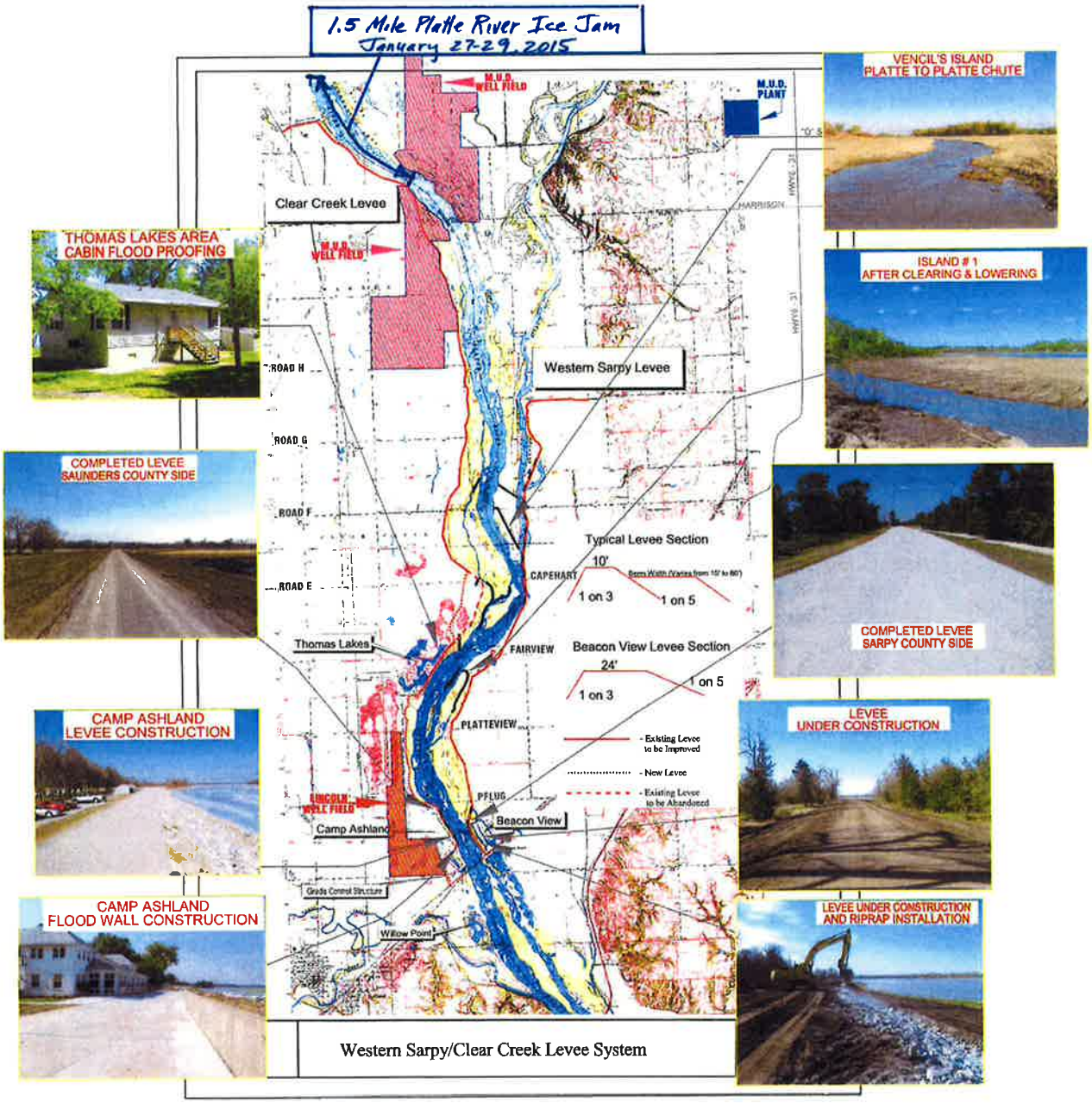
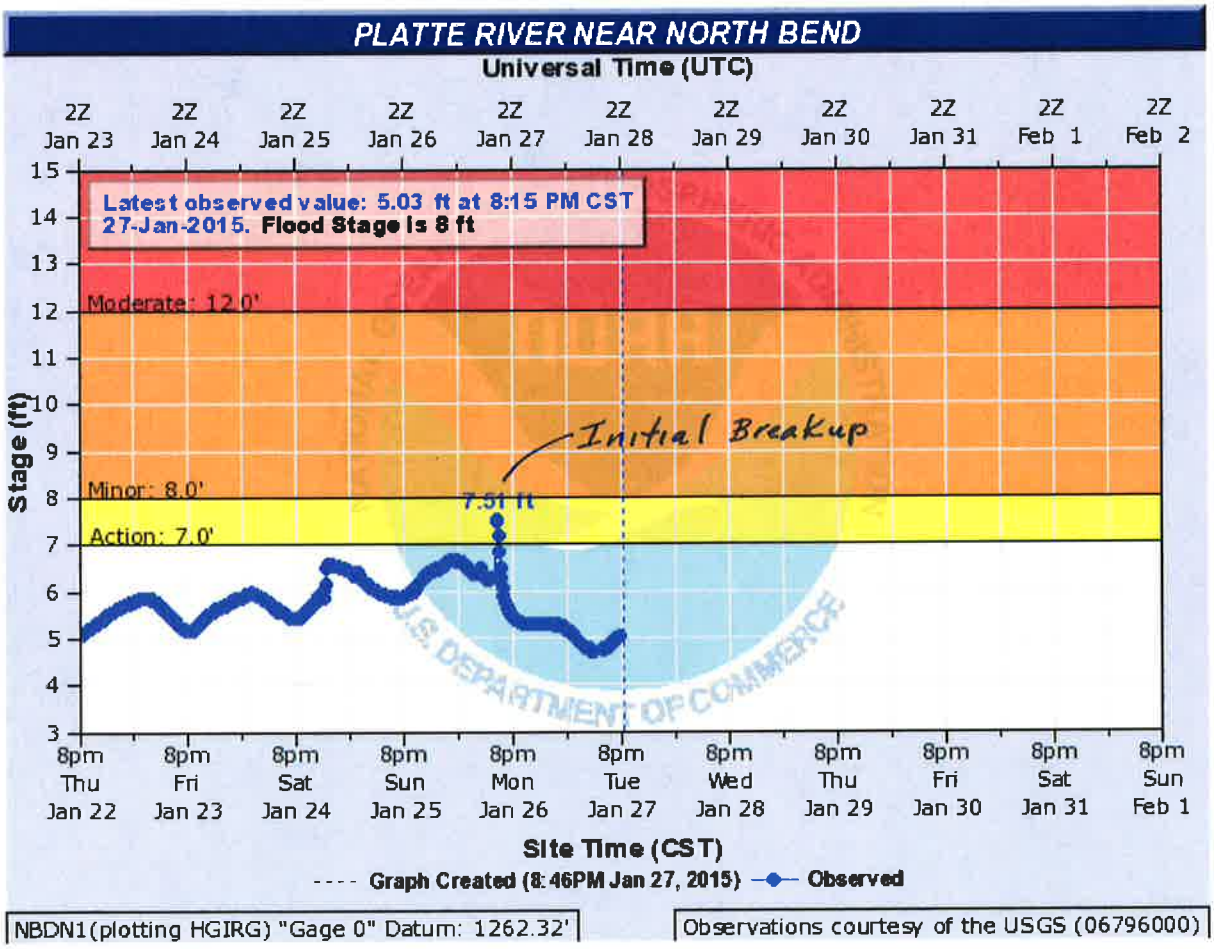
W Center Rd
CR M
NE 92
Provencal Est
Avignon Cir
Old Trl
F St
CR L
CR 4
1.5 MILE ICE JAM
CLEAR CREEK LEVEE
CR K
N
W
E
S
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors

WESTERN SARPY/ CLEAR CREEK LEVEE PROJECT WITH COMPLETED FEATURES



US ARMY CORPS
OF ENGINEERS
OMAHA DISTRICT

WESTERN SARPY
& CLEAR CREEK
PROJECT FEATURES
AS OF JULY, 2014


PLATTE RIVER NEAR NORTH BEND
Universal Time (UTC)
2Z Jan 23
2Z Jan 24
2Z Jan 25
2Z Jan 26
2Z Jan 27
2Z Jan 28
2Z Jan 29
2Z Jan 30
2Z Jan 31
2Z Feb 1
2Z Feb 2
Latest observed value: 5.03 ft at 8:15 PM CST 27-Jan-2015. Flood Stage is 8 ft
Moderate: 12.0'
Minor: 8.0'
Action: 7.0'
Initial Breakup
7.51 ft
Stage (ft)
15
14
13
12
11
10
9
8
7
6
5
4
3
8pm Thu Jan 22
8pm Fri Jan 23
8pm Sat Jan 24
8pm Sun Jan 25
8pm Mon Jan 26
8pm Tue Jan 27
8pm Wed Jan 28
8pm Thu Jan 29
8pm Fri Jan 30
8pm Sat Jan 31
8pm Sun Feb 1
Site Time (CST)
Graph Created (8:46PM Jan 27, 2015)
Observed
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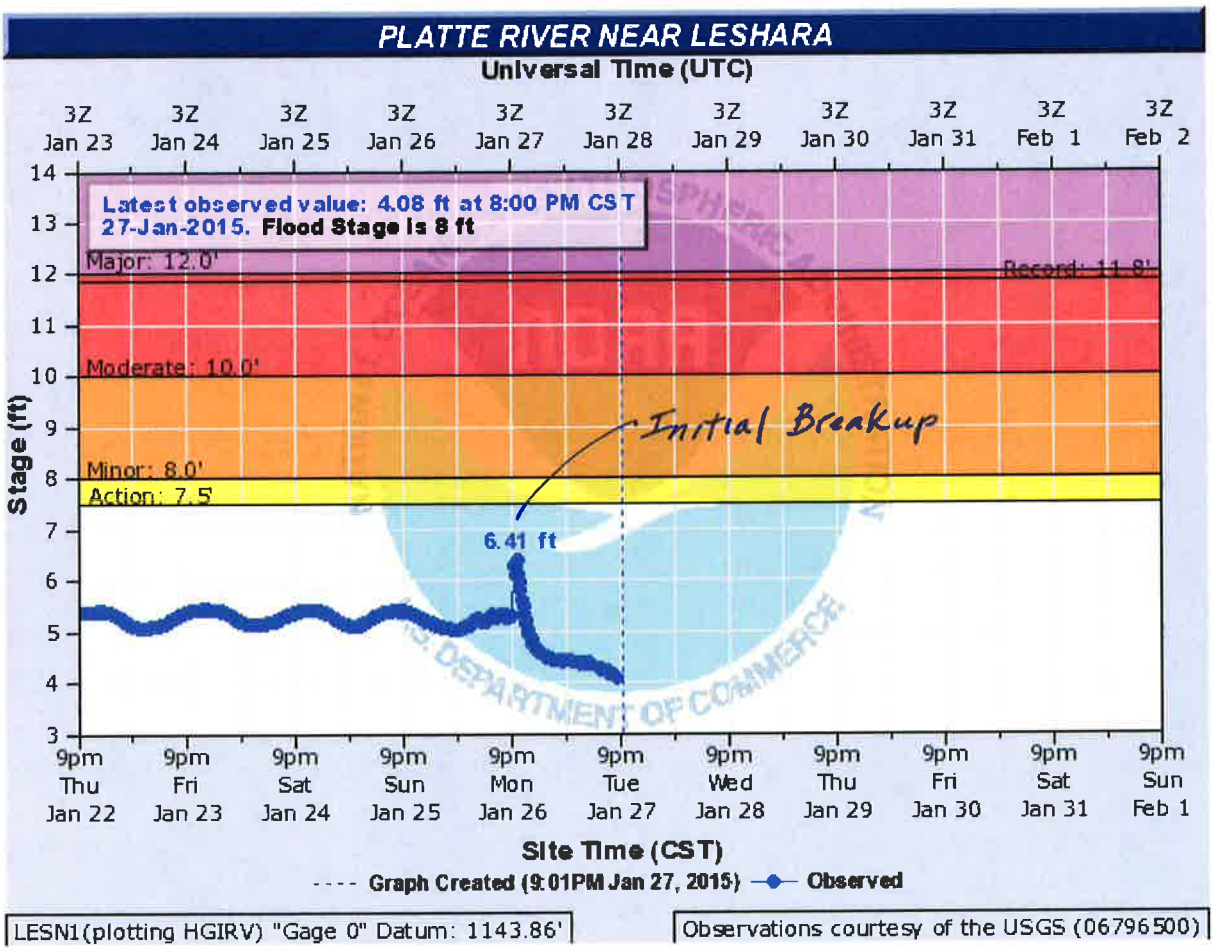
Observations courtesy of the USGS (06796000)


PLATTE RIVER NEAR LESHARA
Universal Time (UTC)
3Z Jan 23
3Z Jan 24
3Z Jan 25
3Z Jan 26
3Z Jan 27
3Z Jan 28
3Z Jan 29
3Z Jan 30
3Z Jan 31
3Z Feb 1
3Z Feb 2
Latest observed value: 4.08 ft at 8:00 PM CST 27-Jan-2015. Flood Stage is 8 ft
Major: 12.0'
Record: 11.8'
Moderate: 10.0'
Minor: 8.0'
Action: 7.5'
Initial Breakup
6.41 ft
Stage (ft)
14
13
12
11
10
9
8
7
6
5
4
3
9pm Thu Jan 22
9pm Fri Jan 23
9pm Sat Jan 24
9pm Sun Jan 25
9pm Mon Jan 26
9pm Tue Jan 27
9pm Wed Jan 28
9pm Thu Jan 29
9pm Fri Jan 30
9pm Sat Jan 31
9pm Sun Feb 1
Site Time (CST)
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Observed
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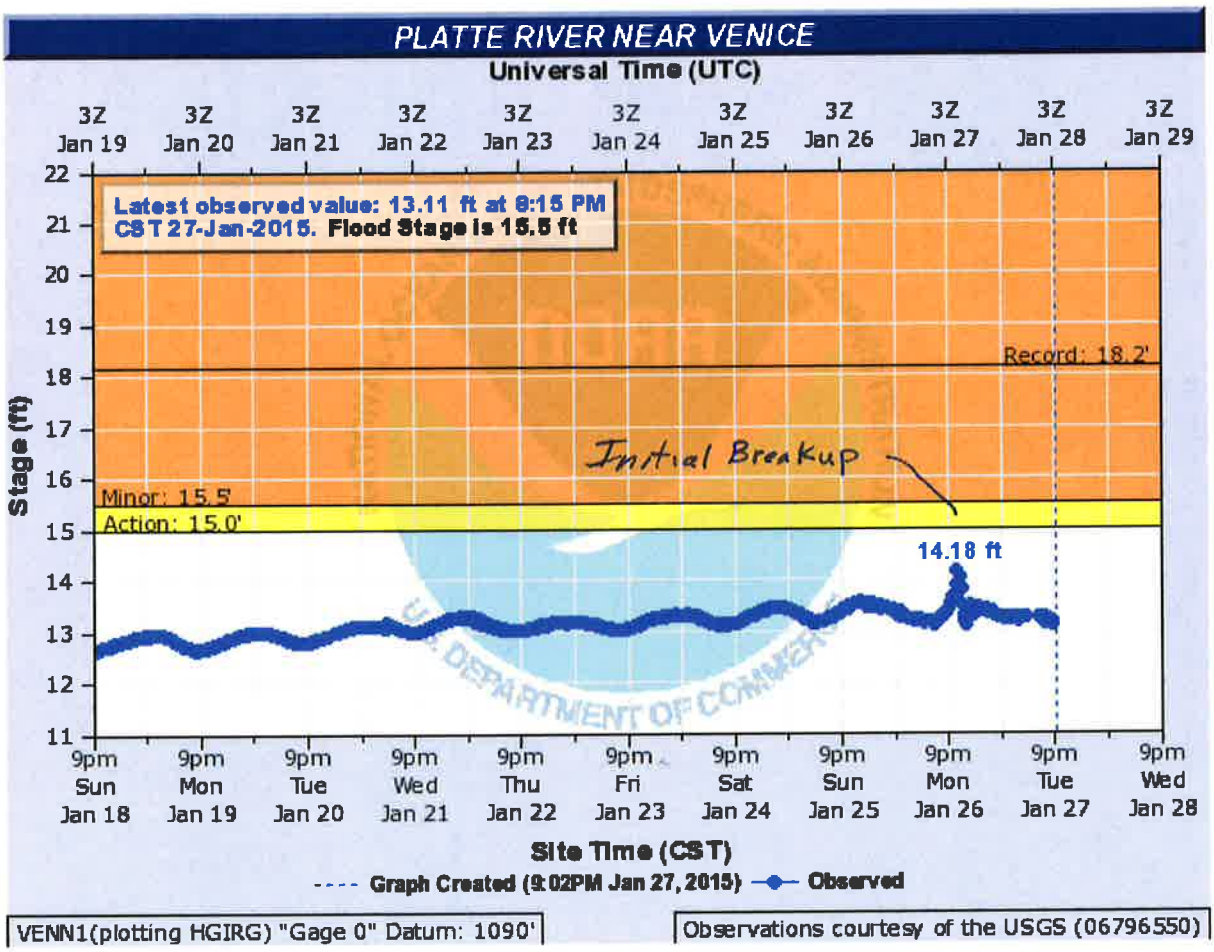
Observations courtesy of the USGS (06796500)


PLATTE RIVER NEAR VENICE
Universal Time (UTC)
3Z Jan 19
3Z Jan 20
3Z Jan 21
3Z Jan 22
3Z Jan 23
3Z Jan 24
3Z Jan 25
3Z Jan 26
3Z Jan 27
3Z Jan 28
3Z Jan 29
Latest observed value: 13.11 ft at 8:15 PM CST 27-Jan-2015. Flood Stage is 15.5 ft
Record: 18.2'
Initial Breakup
Minor: 15.5'
Action: 15.0'
14.18 ft
Stage (ft)
22
21
20
19
18
17
16
15
14
13
12
11
9pm Sun Jan 18
9pm Mon Jan 19
9pm Tue Jan 20
9pm Wed Jan 21
9pm Thu Jan 22
9pm Fri Jan 23
9pm Sat Jan 24
9pm Sun Jan 25
9pm Mon Jan 26
9pm Tue Jan 27
9pm Wed Jan 28
Site Time (CST)
Graph Created (9:02PM Jan 27, 2015)
Observed
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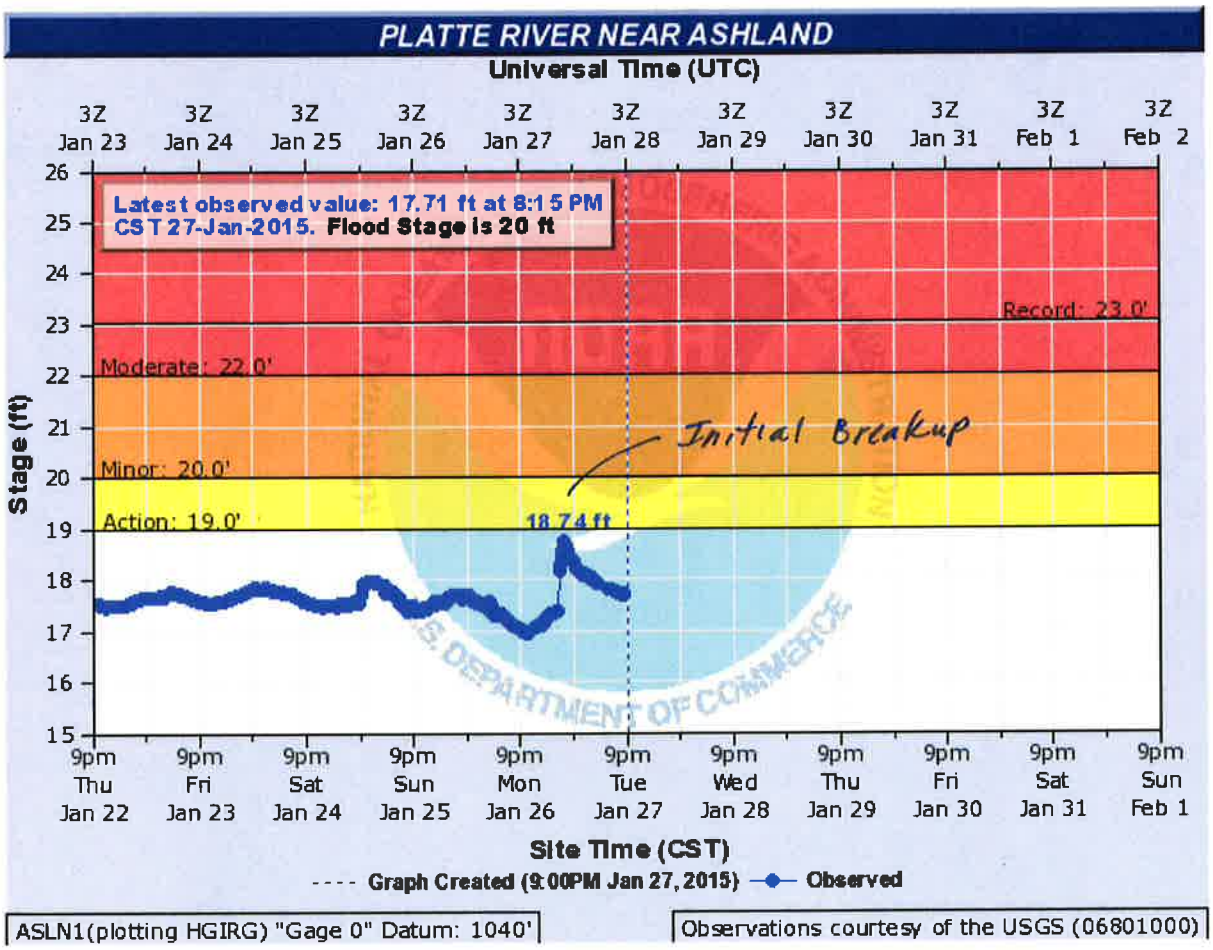
Observations courtesy of the USGS (06796550)


PLATTE RIVER NEAR ASHLAND
Universal Time (UTC)
3Z Jan 23
3Z Jan 24
3Z Jan 25
3Z Jan 26
3Z Jan 27
3Z Jan 28
3Z Jan 29
3Z Jan 30
3Z Jan 31
3Z Feb 1
3Z Feb 2
Latest observed value: 17.71 ft at 8:15 PM CST 27-Jan-2015. Flood Stage is 20 ft
Record: 23.0'
Moderate: 22.0'
Minor: 20.0'
Action: 19.0'
Initial Breakup
18.74 ft
Stage (ft)
26
25
24
23
22
21
20
19
18
17
16
15
9pm Thu Jan 22
9pm Fri Jan 23
9pm Sat Jan 24
9pm Sun Jan 25
9pm Mon Jan 26
9pm Tue Jan 27
9pm Wed Jan 28
9pm Thu Jan 29
9pm Fri Jan 30
9pm Sat Jan 31
9pm Sun Feb 1
Site Time (CST)
Graph Created (9:00PM Jan 27, 2015)
Observed
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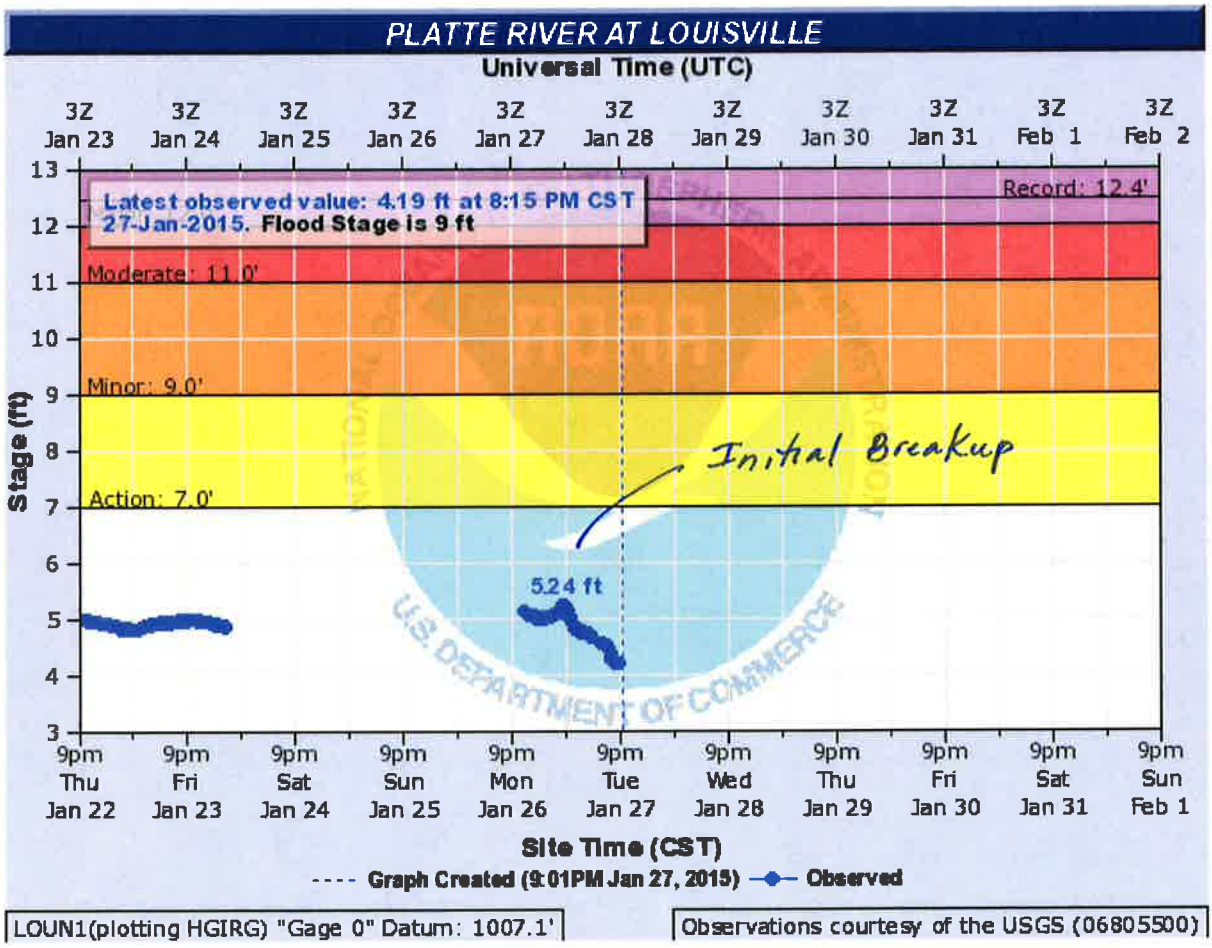
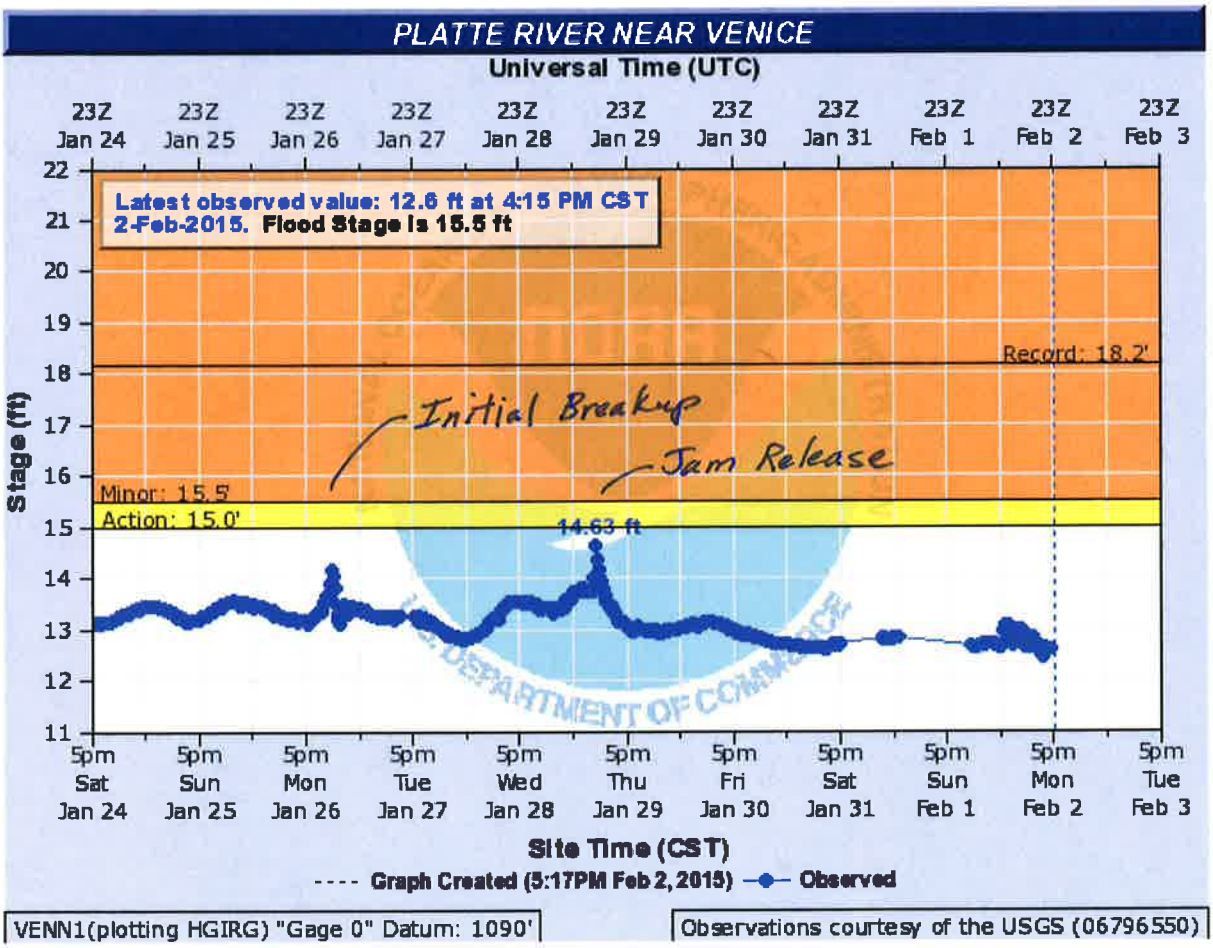
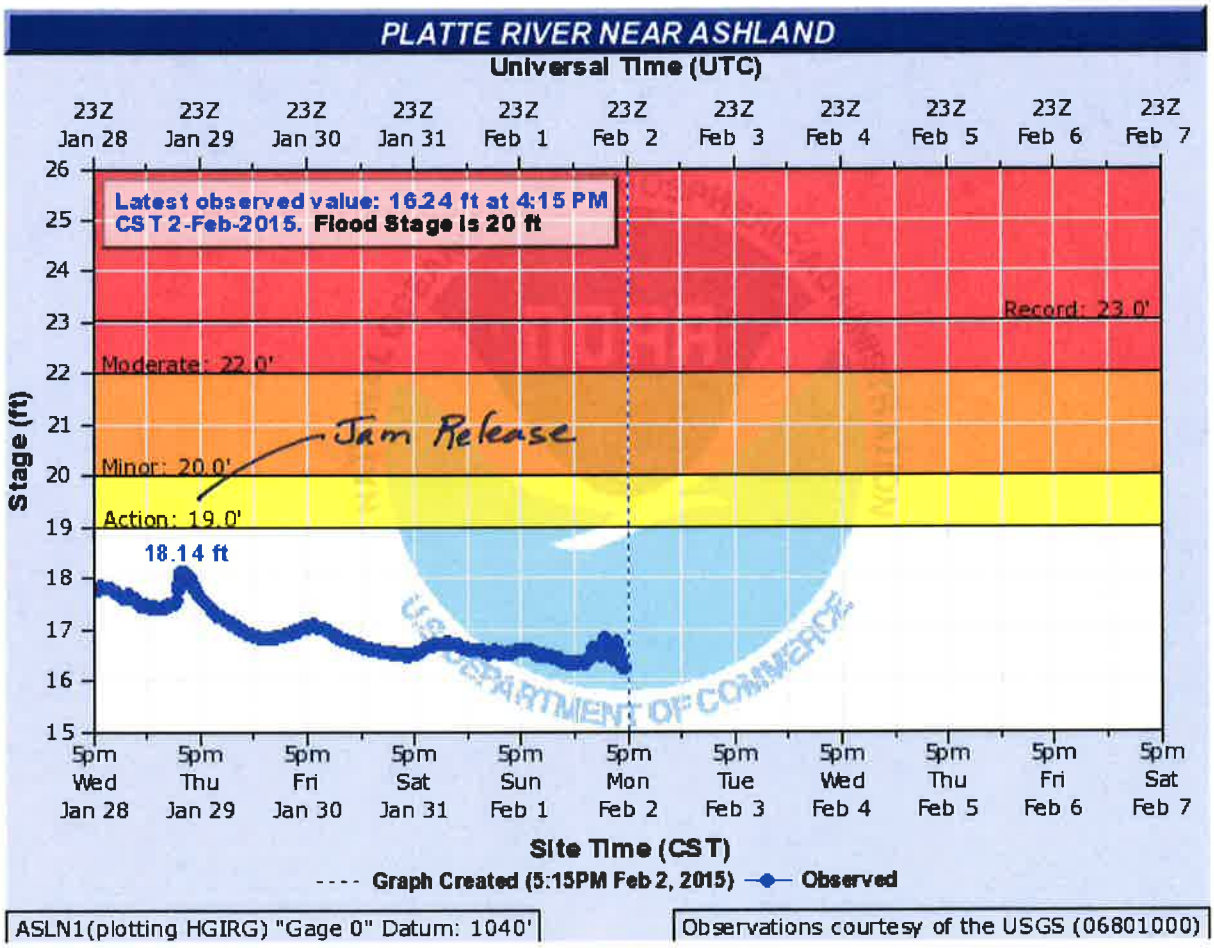
Observations courtesy of the USGS (06801000)


PLATTE RIVER AT LOUISVILLE
Universal Time (UTC)
3Z Jan 23
3Z Jan 24
3Z Jan 25
3Z Jan 26
3Z Jan 27
3Z Jan 28
3Z Jan 29
3Z Jan 30
3Z Jan 31
3Z Feb 1
3Z Feb 2
Latest observed value: 4.19 ft at 8:15 PM CST 27-Jan-2015. Flood Stage is 9 ft
Record: 12.4'
Moderate: 11.0'
Minor: 9.0'
Action: 7.0'
Stage (ft)
Initial Breakup
5.24 ft
9pm Thu Jan 22
9pm Fri Jan 23
9pm Sat Jan 24
9pm Sun Jan 25
9pm Mon Jan 26
9pm Tue Jan 27
9pm Wed Jan 28
9pm Thu Jan 29
9pm Fri Jan 30
9pm Sat Jan 31
9pm Sun Feb 1
Site Time (CST)
Graph Created (9:01PM Jan 27, 2015)
Observed
LOUN1(plotting HGIRG) "Gage 0" Datum: 1007.1'
Observations courtesy of the USGS (06805500)


PLATTE RIVER NEAR VENICE
Universal Time (UTC)
23Z Jan 24
23Z Jan 25
23Z Jan 26
23Z Jan 27
23Z Jan 28
23Z Jan 29
23Z Jan 30
23Z Jan 31
23Z Feb 1
23Z Feb 2
23Z Feb 3
Latest observed value: 12.6 ft at 4:15 PM CST 2-Feb-2015. Flood Stage is 15.5 ft
Record: 18.2'
Initial Breakup
Jam Release
Minor: 15.5'
Action: 15.0'
14.63 ft
Stage (ft)
22
21
20
19
18
17
16
15
14
13
12
11
5pm Sat Jan 24
5pm Sun Jan 25
5pm Mon Jan 26
5pm Tue Jan 27
5pm Wed Jan 28
5pm Thu Jan 29
5pm Fri Jan 30
5pm Sat Jan 31
5pm Sun Feb 1
5pm Mon Feb 2
5pm Tue Feb 3
Site Time (CST)
Graph Created (5:17PM Feb 2, 2015)
Observed
VENN1(plotting HGIRG) "Gage 0" Datum: 1090'
Observations courtesy of the USGS (06796550)


PLATTE RIVER NEAR ASHLAND
Universal Time (UTC)
23Z Jan 28
23Z Jan 29
23Z Jan 30
23Z Jan 31
23Z Feb 1
23Z Feb 2
23Z Feb 3
23Z Feb 4
23Z Feb 5
23Z Feb 6
23Z Feb 7
Latest observed value: 16.24 ft at 4:15 PM CST 2-Feb-2015. Flood Stage is 20 ft
Record: 23.0'
Moderate: 22.0'
Jam Release
Minor: 20.0'
Action: 19.0'
18.14 ft
Stage (ft)
26
25
24
23
22
21
20
19
18
17
16
15
5pm Wed Jan 28
5pm Thu Jan 29
5pm Fri Jan 30
5pm Sat Jan 31
5pm Sun Feb 1
5pm Mon Feb 2
5pm Tue Feb 3
5pm Wed Feb 4
5pm Thu Feb 5
5pm Fri Feb 6
5pm Sat Feb 7
Site Time (CST)
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Observed
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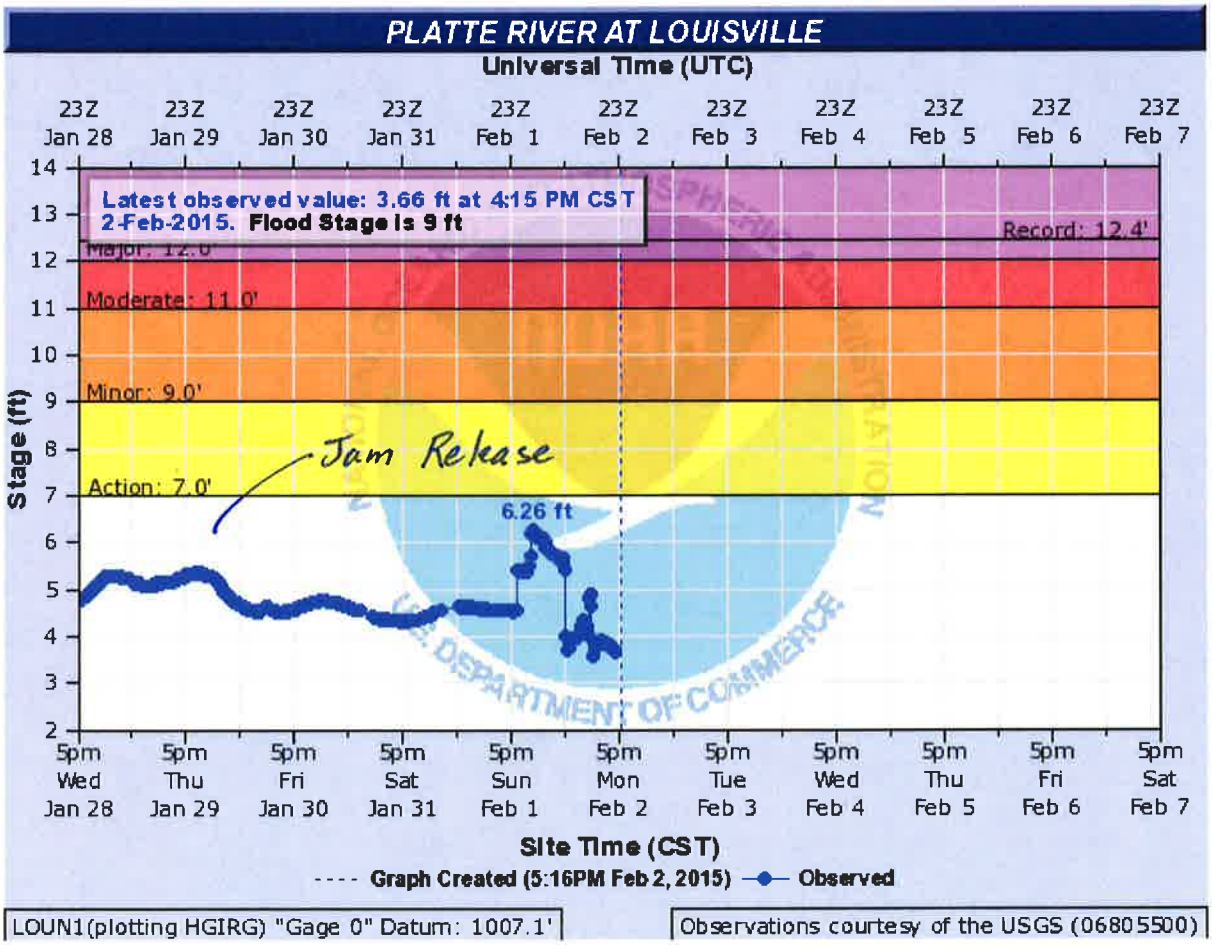
Observations courtesy of the USGS (06801000)


PLATTE RIVER AT LOUISVILLE
Universal Time (UTC)
23Z Jan 28
23Z Jan 29
23Z Jan 30
23Z Jan 31
23Z Feb 1
23Z Feb 2
23Z Feb 3
23Z Feb 4
23Z Feb 5
23Z Feb 6
23Z Feb 7
Latest observed value: 3.66 ft at 4:15 PM CST 2-Feb-2015. Flood Stage is 9 ft
Record: 12.4'
Major: 12.0'
Moderate: 11.0'
Minor: 9.0'
Action: 7.0'
Jam Release
6.26 ft
Stage (ft)
14
13
12
11
10
9
8
7
6
5
4
3
2
5pm Wed Jan 28
5pm Thu Jan 29
5pm Fri Jan 30
5pm Sat Jan 31
5pm Sun Feb 1
5pm Mon Feb 2
5pm Tue Feb 3
5pm Wed Feb 4
5pm Thu Feb 5
5pm Fri Feb 6
5pm Sat Feb 7
Site Time (CST)
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Observed
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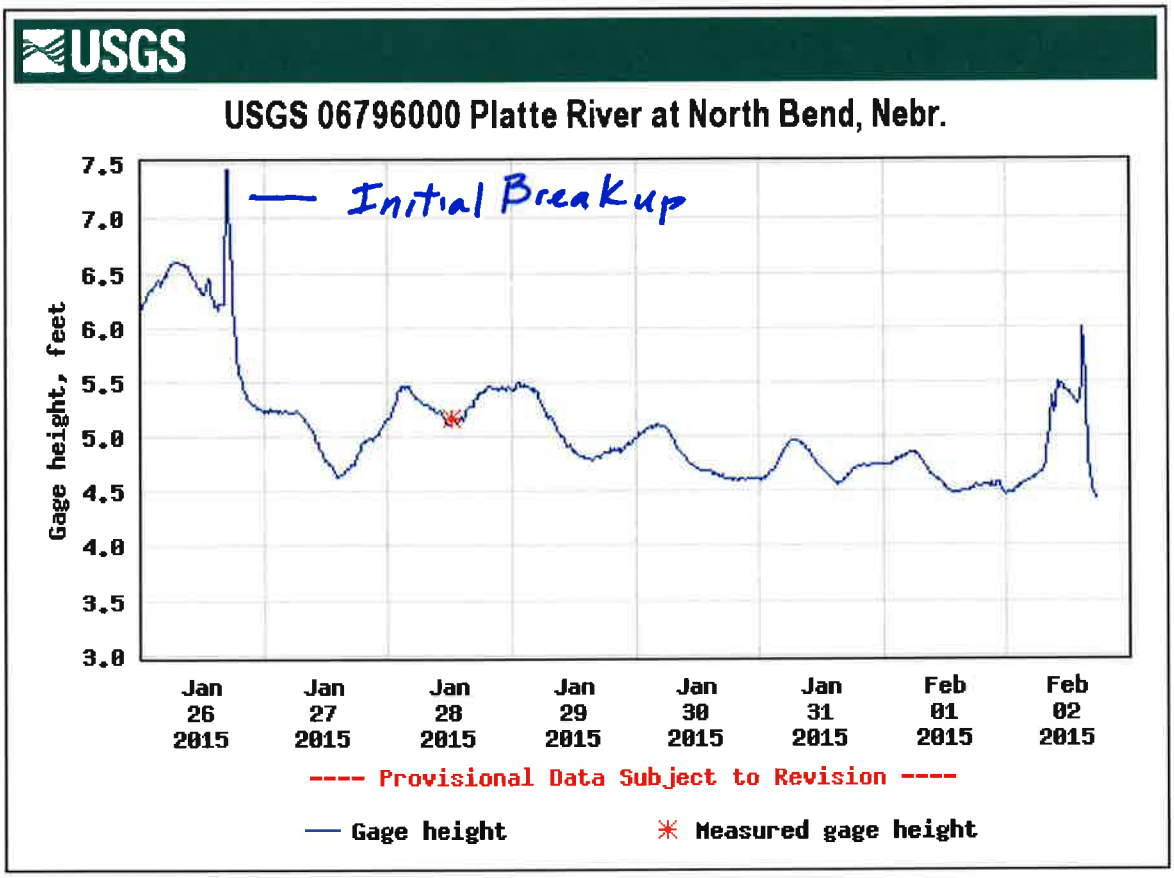
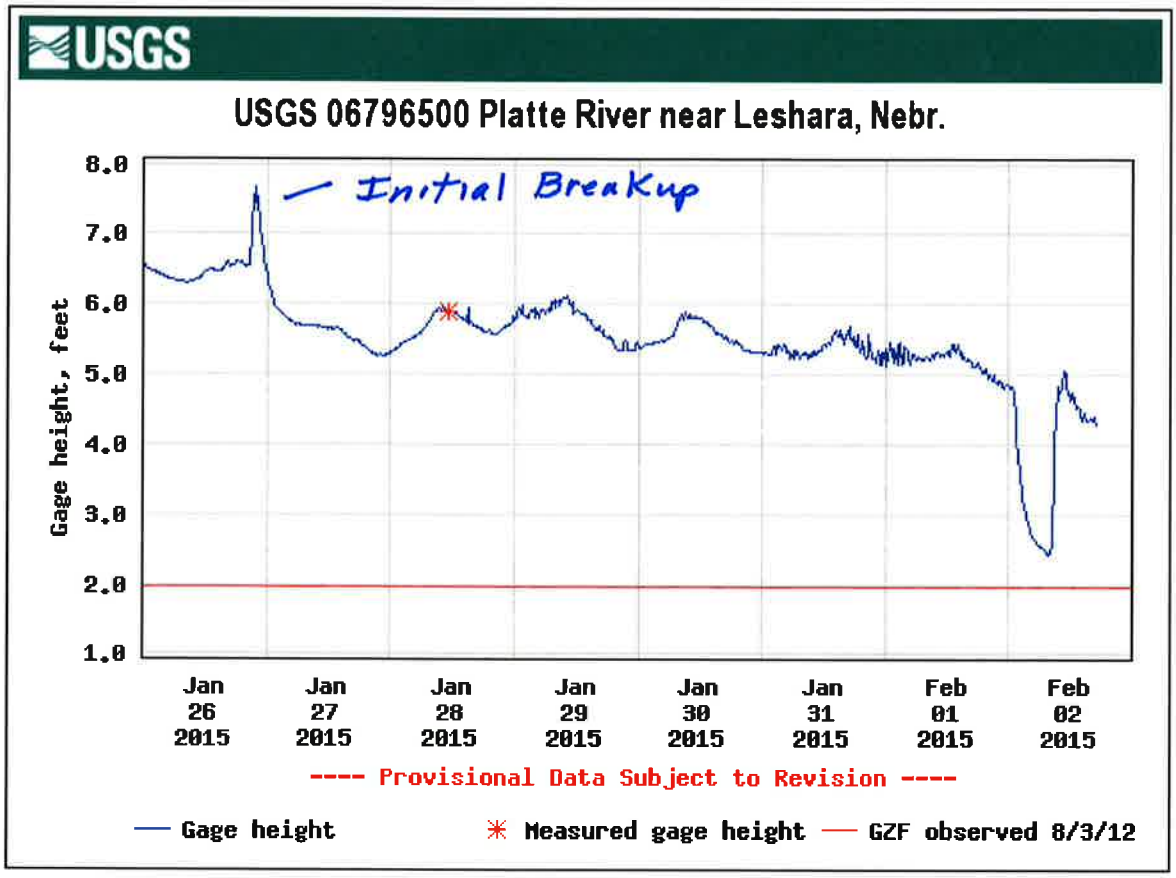
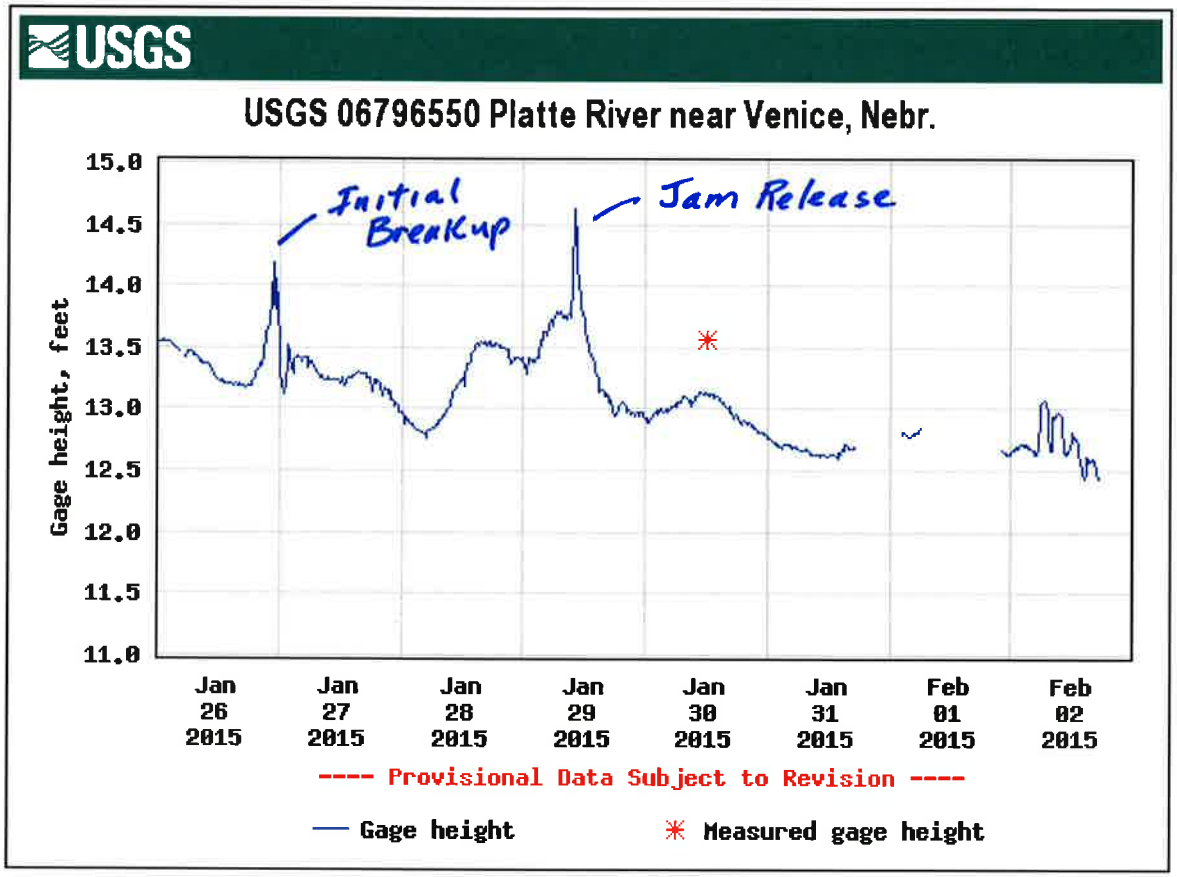
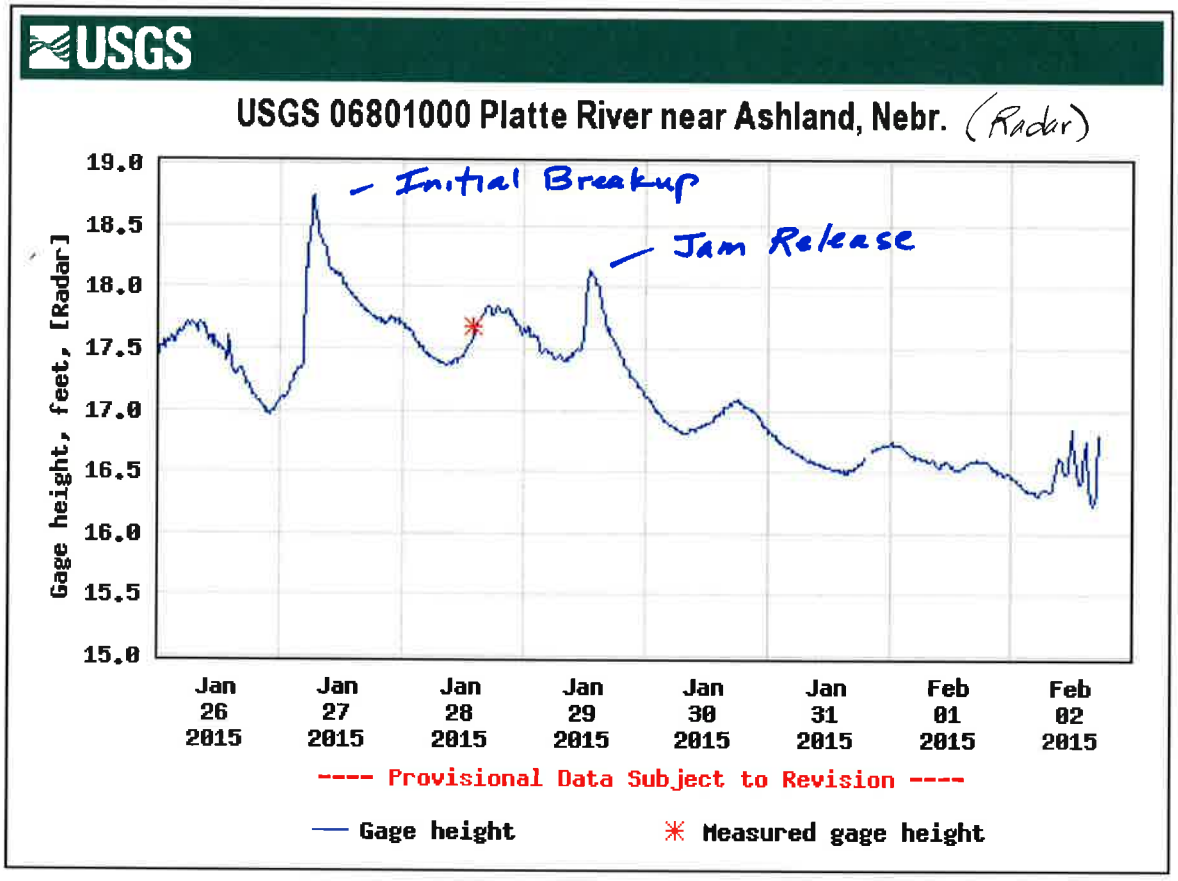
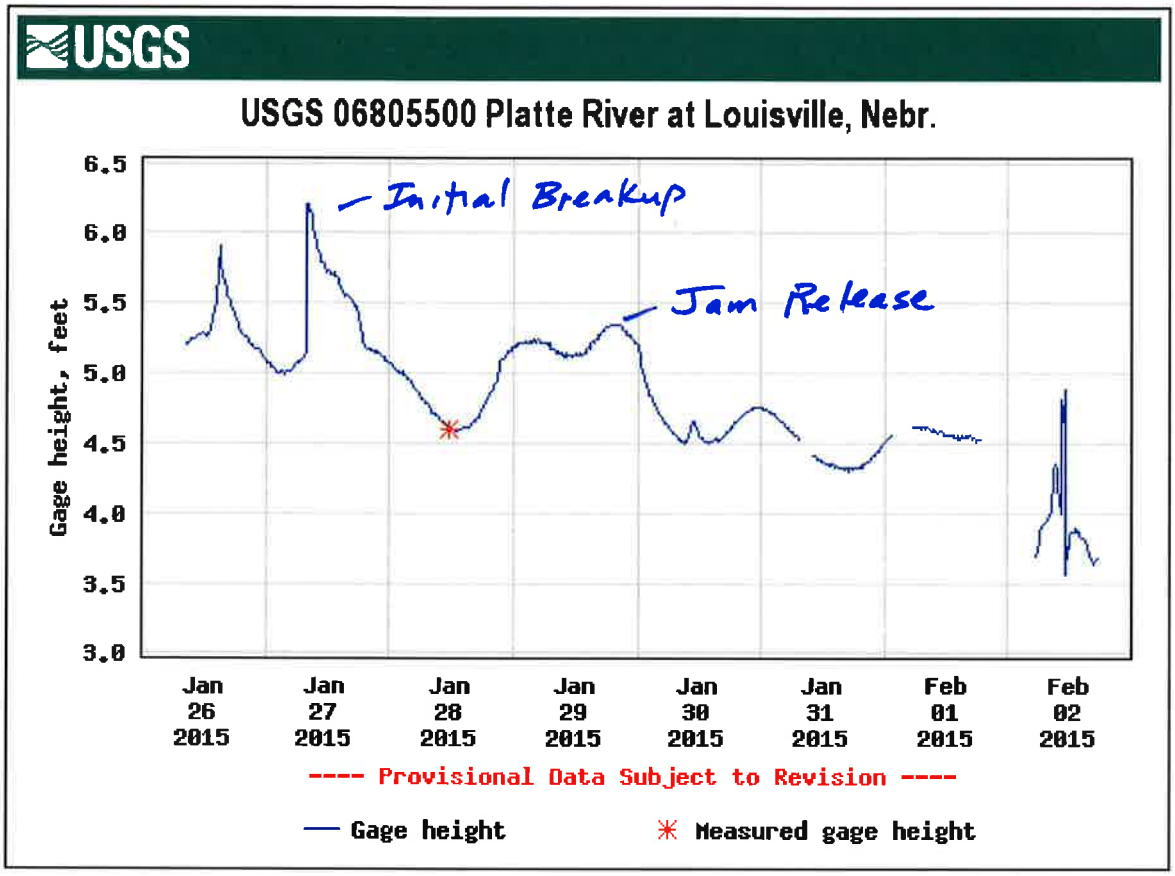
Observations courtesy of the USGS (06805500)


USGS
USGS 06796000 Platte River at North Bend, Nebr.
Initial Breakup
Gage height, feet
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
Jan 26 2015
Jan 27 2015
Jan 28 2015
Jan 29 2015
Jan 30 2015
Jan 31 2015
Feb 01 2015
Feb 02 2015
---- Provisional Data Subject to Revision ----
Gage height
Measured gage height


USGS
USGS 06796500 Platte River near Leshara, Nebr.
Initial Breakup
Gage height, feet
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
Jan 26 2015
Jan 27 2015
Jan 28 2015
Jan 29 2015
Jan 30 2015
Jan 31 2015
Feb 01 2015
Feb 02 2015
---- Provisional Data Subject to Revision ----
Gage height
Measured gage height
GZF observed 8/3/12


USGS
USGS 06796550 Platte River near Venice, Nebr.
Initial Breakup
Jam Release
Gage height, feet
15.0
14.5
14.0
13.5
13.0
12.5
12.0
11.5
11.0
Jan 26 2015
Jan 27 2015
Jan 28 2015
Jan 29 2015
Jan 30 2015
Jan 31 2015
Feb 01 2015
Feb 02 2015
---- Provisional Data Subject to Revision ----
Gage height
Measured gage height


USGS
USGS 06801000 Platte River near Ashland, Nebr. (Radar)
Initial Breakup
Jam Release
Gage height, feet, [Radar]
19.0
18.5
18.0
17.5
17.0
16.5
16.0
15.5
15.0
Jan 26 2015
Jan 27 2015
Jan 28 2015
Jan 29 2015
Jan 30 2015
Jan 31 2015
Feb 01 2015
Feb 02 2015
---- Provisional Data Subject to Revision ----
Gage height
Measured gage height


USGS
USGS 06805500 Platte River at Louisville, Nebr.
Initial Breakup
Jam Release
Gage height, feet
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
Jan 26 2015
Jan 27 2015
Jan 28 2015
Jan 29 2015
Jan 30 2015
Jan 31 2015
Feb 01 2015
Feb 02 2015
---- Provisional Data Subject to Revision ----
Gage height
Measured gage height